

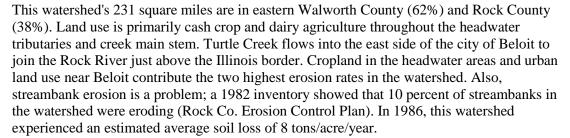
TURTLE CREEK WATERSHED (LR01)







Smallmouth bass: adult and young



A priority watershed project under the Wisconsin Nonpoint Source Water Pollution Abatement Program began in 1984 and was completed in 1994. The project, jointly administered by the Rock and Walworth County Land Conservation Departments and WDNR, had four water quality and water use objectives:

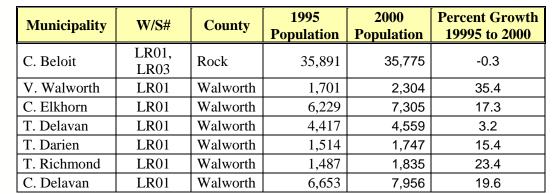
- 1. Improve the smallmouth bass fishery in main stem Turtle Creek and Little Turtle Creek.
- 2. Protect and improve fish habitat and water quality of tributaries to Turtle Creek
- 3. Protect and improve fish habitat in creeks that currently support remnant populations of Wisconsin's endangered and threatened fish species.
- 4. Retard the eutrophication process in Lakes Delavan and Comus.

According to the 1994 post-project evaluation report, the effectiveness of best management practice implementation was evident on a site-by-site basis, but there was no discernible watershed-wide reduction in nonpoint source (runoff) pollutant loads. Low participation rates and implementation of best management practices that brought landowners short-term benefits are sited as reasons for this result. Poor livestock management practices, such as cropping too close to stream channels, overgrazing of pastures, and livestock grazing in streambanks in headwater streams, limited the overall effectiveness of the project.



Gravel chub

Table 1. Municipalities in the Turtle Creek Watershed





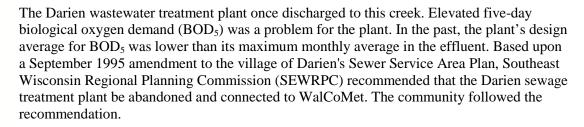
Brown trout:
Adult and young

Municipality	W/S#	County	Percent Growth 19995 to 2000		
V. Darien	LR01	Walworth	1,295	1,572	21.4
T. Walworth	LR01	Walworth	1,418	1,676	18.2
T. Turtle	LR01	Rock	2,463	2,444	-0.8



STREAMS

<u>Darien Creek</u>. is a small continuous stream that flows for 5.3 miles through agricultural areas. This stream has a sand, gravel and rock substrate and good water clarity. Fluctuating water levels and lack of bank and in-stream cover, however, limits the fishery to forage species. The Ozark minnow and slender madtom, state threatened species, have been found in the stream.





Madtom

<mark>Little Turtle</mark> Creek: <mark>Allen's Gro</mark>ve

<u>Little Turtle Creek</u> Most of Little Turtle Creek's 12 miles have been ditched for drainage of the surrounding farm lands, resulting in habitat deterioration, increased water temperatures, high turbidity, sedimentation, infilling of deep pool habitat, and excessive nutrient and fecal bacteria concentrations.

This stream is managed as a warm water forage fishery. The Rock County portion of this stream is an Exceptional Resource Water. The stream supports the gravel chub and slender madtom, two species on the state threatened and endangered species list. Little Turtle Creek is too shallow to provide habitat for game fish.

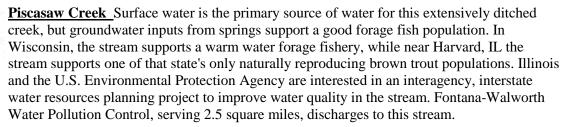
<u>Jackson Creek</u> Water quality in this stream is fair, supporting a limited warm water sport fishery. The creek flows through about 200 acres of wetland. Water quality has improved since the Elkhorn wastewater treatment plant stopped discharging to it. Jackson Creek is a major tributary, both inflow and outflow, to Lake Delavan. This creek has historically carried heavy nutrient and sediment loads to the lake; alterations to the stream and the lake as a part of the Lake Delavan Lake Project may have reduced nutrient and sediment loading. The stream's outflow from Lake Delavan supports walleye, yellow perch, largemouth bass, and various panfish.



<u>Ladd Creek</u> This five-mile long creek has been extensively ditched, reducing cover and causing elevated temperatures that result in poor fish habitat. The creek is managed as a forage fishery since it is flow limited. The Ozark minnow, a state threatened species, is found in this creek.



Brown trout

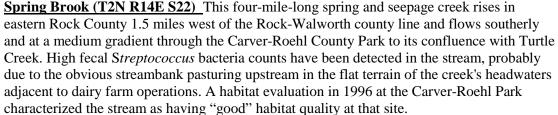




Spring Brook (T1N R14E S31) is a seepage-and-spring-fed, nine-mile-long tributary to Turtle Creek. The stream is shallow and its flow is greatly reduced in dry years; the stream receives flow from the Clinton wastewater treatment plant and cooling water from Hormel. Possible temperature alterations to Spring Creek from the Hormel discharge are of concern. Biotic survey work would determine what, if any, biological impacts point source discharges have had on this creek. The stream supports a diverse array of minnow species.



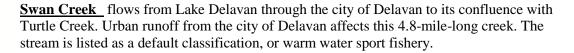
Minnow species





<mark>Ozark Min</mark>now

The fishery has an outstanding diversity of minnow species. The stream serves as a nursery area for Turtle Creek game and forage fish species. Spring Brook is designated an Exceptional Resource Water in its lower reach (T2N R14E S27) due to the presence of the Ozark minnow and because its lower reach supports outstanding ecological diversity compared to other streams in the region.





Turtle Creek surrounded by agriculture

<u>Turtle Creek--Turtle Lake to Comus Lake</u> This segment of Turtle Creek is almost entirely ditched and has a low gradient, dropping 11 feet over its 5.5 mile length, with a barely perceptible flow in portions. Though primarily a forage fishery segment, panfish are common. More than 300 acres of wetland lie along the stream just north of Lake Comus. This segment is affected by channelization, drainage tiles, sedimentation from cropland runoff and wind erosion, stream bank sloughing, chemical fertilizers and pesticides, and excess nutrients from animal waste. Its potential use is a warm water forage fishery.

Turtle Creek--Comus Lake to Rock-Walworth County Line

This 13-mile stretch of stream (plus Comus Lake) is buffered by more than 2,000 acres of adjacent wetlands in the nearby state-owned wildlife area. This segment is, however, affected by urban polluted runoff from the city of Delavan and exhibits low dissolved oxygen and high turbidity, especially during low flow conditions. A marginal smallmouth bass fishery exists and the threatened Ozark minnow has been found in a tributary to this stretch. In the past, WDNR proposals for habitat enhancements have been deferred due to excessive polluted runoff impacts and the stream's natural limitations. This segment's potential is considered warm water forage fishery.



<u>Turtle Creek--Rock-Walworth Co. Line to the WI/IL Border</u> This 20-mile segment runs from the Rock-Walworth county line southwest to where it empties into the Rock River at Beloit. A high quality resource, it is designated an Exceptional Resource Water. This segment has a higher gradient than the first two segments, but it is still affected by urban polluted runoff in the Beloit area and by sediment from adjacent corn fields and severely eroding streambanks upstream of the city.

The Shopiere Dam was removed in 2000. Walleye, catfish, northern pike, and panfish now have access to the upper reaches of the stream. Formerly, Turtle Creek supported an excellent smallmouth bass fishery below the dam and a marginal smallmouth bass fishery above the dam. The removal of the Shopiere Dam has enabled fish migration and the smallmouth bass fishery is expected to improve.



<u>Unnamed Stream T2N R14E S31</u> This stream rises near Avalon and flows southwest to its confluence with Turtle Creek. Not much is known about this stream.

LAKES



<mark>Common</mark> Carp

Comus Lake is a 164-acre lake in Walworth County with a maximum and mean depth of six feet and four feet, respectively. With this large size and shallow depth, fish kills occur. Other problems the lake encounters include: urban stormwater runoff and polluted agricultural runoff from the lake's immediate watershed, including the city of Delavan. While the lake is located northeast of Delavan, one-half of the lake's acreage is located in the city's sewer service area and the lake's northern shoreline will be sewered in the future (SEWRPC). The lake has recently undergone dredging by the Comus lake management organization. The lake also experiences in-lake and shoreline habitat loss or degradation, turbidity from stormwater and agricultural runoff, and aquatic plants dominate the lake's littoral zone. An endangered rattlesnake was sighted at the lake in the 1980s. In 1995 SEWRPC recommended that the Lake Comus Sanitary District participate in WDNR Self-Help Monitoring to collect water quality data.

<u>Lake Delavan</u> is a moderately large eutrophic lake in Walworth County. A dam on Swan Creek, the lake's outlet stream, elevates the lake level by three feet. Due to excess nutrients the lake has been plagued for years by poor water quality, severe blue-green algae blooms, excessive populations of rough fish, anoxic conditions and fishkills. Construction of a municipal sewer system eliminated septic systems surrounding the lake by 1981 and a complete restoration was attempted in the late 1980s and 1990s. The restoration included dewatering, pesticide application for carp removal, and extensive alum treatments. However, tons of phosphorus and nutrient-rich sediments remain in the lake.

Although the lake's excess nutrients no longer result in the large blue-green algae mats of the 1970s and 1980s, an overabundant fishery and excessive populations of Eurasian water milfoil are now problematic. An Aquatic Plant Management Plan was completed for the lake in 1993 by Aron & Associates. In 1975, more than 15 percent of the lake's direct drainage was urbanized; today this percentage is likely higher. Plans for a new dog track and numerous new subdivisions in the direct drainage area ensure that stormwater management,

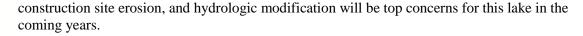


A carp removal project





Eurasian watermilfoil: sprig and close-up



The Lake Restoration Project implemented by local citizens, governmental units, the University of Wisconsin, WDNR, U.S. Geologic Survey and U.S. Environmental Protection Agency in the 1980s and 1990s included the following milestones: short-circuiting the mixing of nutrients coming into the lake from Jackson Creek; drawing down the lake for treatment of rough fish (carp) with the chemical rotenone; and application of aluminum sulphate on the lake bottom to reduce nutrient exchange between lake sediments and lake water. The plan also included reducing nutrient and sediment loads through wetland restoration and creation. About 125 acres of existing wetland and farmed wetlands at the confluence of Jackson Creek and its major tributary were selected for restoration/creation (Helsel and MacKinnon 1995). An 85-acre wetland was constructed to reduce sediment and nutrients entering the lake. This Lake Renewal Plan, funded by U.S. EPA's Clean Lakes Program, was implemented in coordination with the activities funded under the Turtle Creek Priority Watershed Project.

<u>Turtle Lake</u> is a quiet spring-fed lake in Walworth County that covers 140 acres, has a maximum depth of 35 feet and forms the headwaters of Turtle Creek. The lake's shoreline is a mixture of wetlands with development both on the east and north sides of the waterbody. There is a trailer park on the lake's shoreline that once had problems from leaking holding tanks. About 113 of the 748 acres that directly drain into the lake were urbanized as of 1975 (SEWRPC); today the acreage of direct drainage that is urbanized is a greater amount. There is limited public access on the lake and very little water quality data exists. Eurasian water milfoil and purple loosestrife are present in the lake and its shoreline area.

There is a lake management association for the lake and volunteer monitoring for chemistry is conducted regularly. A Lakes Planning Grant should be pursued to conduct a thorough survey of the lake's water quality and habitat and to identify and protect the remaining wetlands that surround the lake.



WDNR's Heritage Resources Database indicates that the following water-dependent endangered, threatened or special concern species and/or communities have been sighted in this watershed within the last 20 years.



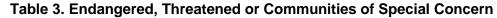
Purple loosestrife



Species Common Name	Latin Name	Habitat						
Gravel Chub	Erimystax x-punctatus	Turtle Creek						
Ozark Minnow	Notropis nubilus	Turtle Creek, Darien Creek, Little Turtle Creek, Ladd Creek						
Greater Redhorse	Moxostoma valenciennesi	Turtle Creek						
Slender Madtom	Noturus exilis	Little Turtle Creek						
Eastern Massasauga	Sistrurus catenatus catenatus	Turtle Lake Marsh						
Lake Chubsucker	Erimyzon sucetta	Turtle Creek and Lake						
Banded Killifish	Fundulus diaphanus	Turtle Lake						



Gravel chub







Slender madtom



White oak in fall colors

Plant Community	Location	Indicator Species/Description
Southern Dry Mesic Forest	Murphy's Woods	white oak, bur oak, hackberry, black cherry, american elm
Prairie Remnant	Spring Brook Prairie	various
Prairie Remnant	Frito Lay Prairie	various
Prairie Remnant	Shopiere Railroad Prairie	various
Prairie Remnant	Clinton Railroad Prairie	various
Emergent Aquatic, Southern Sedge Meadow, Calcarious Fen, Shrub Car, Springs/Spring Runs	Turtle Creek Springs	Diverse wetland complex with numerous indicator species; fen contains smaller fringed gentian, swamp milkweed, water horehound, and sneezeweed. Bubbling and perched seepage springs support water cress, forget-me-not, water starwort, and water parsnip.
Shaded Cliffs, Floodplain Forest, Southern Dry- Mesic Forest	Carver-Roehl County Park	Small limestone cliffs carved by spring brook stream; shaded cliffs support bulblet fern, purple cliff brake, clearweed, virginia creeper; wet- mesic wood: basswood, sugar maple, red ash; uplands diverse with rich understory
Southern Sedge Meadow, Shrub-Carr	Delavan Marsh	Along north shore of Turtle Creek; area contains diverse species; some calciphitic plants in portions of the marsh.
Emergent Aquatic, Southern Sedge Meadow, Southern Dry-Mesic Forest	Warbler Trail Sanctuary	Southeast side of Lake Como; undisturbed lake shore; oak maple woods
Dry Mesic Prairie	Utzig Prairie	Situated atop a steep gravel hill, native prairie remains on mid- and lower slopes. Site disturbed by construction; bluegrass and other weedy invaders threaten prairie.

RECOMMENDATIONS

- 1. The Lower Rock River Basin Team should conduct a formal stream classification for <u>Ladd</u>, <u>Piscasaw</u> and <u>Swan creeks</u>, including an assessment of remaining major sources of polluted runoff that may affect water quality of the stream.¹
- 2. The Lower Rock River Basin Team should conduct a stream classification survey for <u>Little Turtle Creek</u> to determine if its use classification should be changed from limited forage fishery to warm water forage fishery. This should include an assessment of remaining major sources of polluted runoff affecting stream water quality.¹
- 3. The <u>Turtle Lake Association</u> should become involved in WDNR's Self-Help Monitoring Program to collect water quality data.²
- 4. The Lower Rock River Basin Team should construct wildlife ponds in the <u>Turtle Creek Wildlife Area</u> ¹.



Lesser fringed gentian

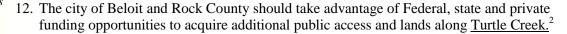


Banded killifish

5. The Lower Rock River Basin Team should evaluate <u>Turtle Creek</u> for adverse impacts to water quality or recreation due to the abandoned Shopiere Dam and develop a long-term plan for dam removal if adverse effects are documented.¹

The Walworth County Land Conservation Department should track enforcement of its 1994 Land Disturbance and Erosion Control and Stormwater Management Ordinance to protect water quality in Lake Delavan and the Turtle Creek Watershed.²

- 7. The <u>cities of Delavan, Elkhorn and Beloit</u> should enact and enforce construction site erosion control and storm water management ordinances.²
- 8. The <u>cities of Beloit, Delavan and Elkhorn</u> should develop comprehensive stormwater management plans that are integrated with their respective cities' urban sewer service area plans and zoning plats and the counties' land use plans.²
- 9. The Comus Lake Management Organization should participate in WDNR's Self-Help Monitoring Program on Comus Lake to track water quality trends in the lake, especially as the city of Delavan grows.²
- 10. The <u>Turtle Lake</u> Management Organization should apply for a lakes planning grant to gather three to four years of baseline water quality and habitat information and to identify and possibly protect the lake's remaining riparian wetlands.²
- 11. Biotic survey work should be conducted on <u>Spring Brook Creek (T1N R14E S31)</u> to determine if point source discharges have caused any biological impacts from changes in water temperature.¹



- 1. These recommendations are a basis for work planning or other decisions which must be approved by the appropriate DNR division administrator (the recommendations are a starting point for the work planning process.
- These recommendations are advisory to the public, local governments, lake management
 organizations, and other groups or agencies. These recommendations are not binding. No statutory or codified
 requirements exist.

ACKNOWLEDGMENTS

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Photo credits: Mike Sorge (fish photos unless noted in the following); Konrad Schmidt (Ozark minnow); Noel M. Burkhead (banded killifish); UW Extension (milfoil sprig, purple loosestrife); Virginia Kline's Vegetation of Wisconsin collection (all other plant photos). Virgil Beck/Wisconsin DNR (fish illustrations); WI Water Resources (turtle drawing).



American elm with seeds



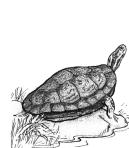
Lake Chubsucker

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Streams Table References

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<mark>Swamp mi</mark>lkweed



Walleye

Table 4. Streams in the Turtle Creek Watershed (LR01)

			Length	Existing Use	Potential Use	Supporting	Current	303(d)	Use	Impairment	Data	Data			
Stream Name	WBIC	County	(Miles)	(Miles)	(Miles)	Potential Use (Miles)	Codified Use	Status	Source	Impact	Assess- ment	Level	Trend	References	
Darien Creek	0791800	Rock Walworth	8	WWSF/8	Same	Part - Thr	WWSF	N	PSI, NPS, HM, CL, URB	HAB, SED, TEMP, FLOW, MIG, NUT	М	B4 H4 C3	D	4, 17, 43, 48, 58, 70, 72, 74, 78	
Dry Creek	0789300	Rock	7	WWFF/7	Same	Full	WWSF*	N	HM, NPS	HAB, TEMP, BAC, DO, NUT, FLOW, FKILL	E	B3 C1	S	4, 17, 43, 72, 74, 78	
Jackson Creek	0793800	Walworth	2.3	WWSF/2.3	Same	Part - Thr	WWSF*	N	HM, CL, SB, NPS, URB, PSI, DO, TURB		E	B3 H3 C4	D	17, 43, 48, 51, 61, 74, 78	
Ladd Creek	0792400	Walworth	3	UNK	UNK	UNK	UNK	N	HM, CL, NPS, PSB	FLOW, HAB, SED, TEMP, NUT	E	B3 H2	U	17, 48, 68, 74	
Little Turtle Creek	0791700	Rock	16	WWFF/16	WWSF	Part - Thr	Thr WWSF ERW		PSM, HM, CL, SB	FLOW, PST, HAB, SED, TEMP, DO, NUT	М	B3 H1 C1	S	4, 17, 43, 48, 72, 74, 78	
Piscasaw Creek	0788900	Walworth	2.5	WWFF/2.5	Same	Part	WWSF*	N	PSM, HM, CL, SB	FLOW, HAB, SED, TEMP	E	B3 H3 C2	S	17, 24, 43, 48, 74, 78	
Spring Brook	0790500	Rock	0 - 8	WWFF/8	Same	Part	WWFF	N	PSI, HM, NPS	TEMP, DO, HAB	М	B3 H1	S	4, 17, 43, 74, 78	
T1NR14ES31	0790500		8 - 10	LAL/2	Same	Part	LAL	N	HM, NPS, PSM	HAB, TURB, TEMP, DO, SED	М	B3 H1	S	4, 17, 43, 74, 76	
			4	WWFF/4	Same	Full - Thr	WWSF*	N		BAC, HAB, SED,		B3 H1	S	4, 17, 43, 74, 78	
Spring Brook T2NR14ES14	0791300	Rock	2 (T2N R14E S27)	WWFF/5	Same	Full - Thr	ERW	N	SB, PSB, CL, NPS	TURB, DO, TEMP, FLOW	М				
Turdle Cook	0700200	Rock	0 - 24.5	WWSF/24.5	Same	Part/24.5	ERW	N	URB, NPS, HM, CL, SB, PSB, BY, CE	HAB, FLOW, TEMP, PST, DO, TURB, SED	М	B4 H4 C3	S	4, 17, 20, 43, 48,	
Turtle Creek	0790300	Walworth	24.5 - 30	WWFF/5.5	WWSF/5.5	Not/5.5	WWSF	Y	URB, NPS, HM, CL, PSB, BY, CE	FLOW, SED, DO, TURB, HAB, TEMP, PST	M B4 H4 C3		I	60, 74, 77, 78	
Swan Creek	0793100	Walworth	0 - 4.8	WWSF/4.8	Same	Part - Thr/.3	WWSF*	N	CL, PSB, URB, HM, DEV, NPS	HAB, TURB, TOX, NUT, SED, TEMP, MAC, DO, FLOW	E	B3 H2	S	43, 48, 74	
Unnamed Stream T2NR14ES31	0791200	Rock	6	WWFF/6	Same	Full	ERW	N			М			4, 43, 74	

Table 5. Lakes in the Turtle Creek Watershed (LR01)

Lake Name	County	Town, Range,	WBIC	Surface Area (Acres)	Max Depth	Mean Depth (ft)	Lake Type	Winter kill	Acc- ess	SH	Hg	Mac	LMO	TSI	TSI Class	Lake Plan Prot	P Sens	Impairment		Comments
		Section	**BIC		(ft)						g	Mac						Source	Impact	Comments
Comus Lake	Walworth	T02NR16E S18	0794200	164	6	4	DG	Υ	BR	R	GA	-	DIST	-	ME	1	IIΒ			
Delavan Lake	Walworth	T02NR16E S20	0793600	2,072	56	21	DG	Z	BR	Х	GA	EM PL ZM	ASSC	43*	ME	PLAN	ΙB	1		
Elkhorn Lake	Walworth	T02NR17E S06	0794000			1	-	1			GA		-		1	1		NPS, URB	NUT, SED	
Trout Lake	Walworth	T02NR15E S07	0793000	1		-	-	-	-		GA	-			-	-	-			
Turtle Lake	Walworth	T03NR15E S14	0795100	140	35	1	SP	N	PRI	С	GA	EM PL	ASSC	48***	ME	1	ΙA	-		